

MINERAL SANDS

► Titanomagnetite ironsand

Titanomagnetite ironsand placers form Quaternary onshore beach and dune deposits and offshore marine deposits along 480 km of coastline from Kaipara Harbour south to Wanganui on the west coast of the North Island. The titanomagnetite was eroded from the Quaternary andesitic volcanic rocks of western Taranaki and the rhyolitic volcanic rocks of the Taupo Volcanic Zone, transported to the coast by rivers, along the coast by shallow-marine longshore currents, and subsequently concentrated by wave and wind action.

The total identified resource is over 850 Mt of concentrate assaying - Fe, - TiO₂ and 0.3 - 0.4% V₂O₅. BHP New Zealand Steel Limited produces about 2.4 M tpa of titanomagnetite concentrate, for export and for domestic steel manufacture, from two mines south of Auckland. The value of this production is nearly \$30M.

At Waikato North Head, south of Auckland, BHP mines 6 M tpa of ironsand which is concentrated on site to produce 1.2 M tpa of titanomagnetite concentrate. Mining of the deposit began in 1969, and production to the end of 2000 is about 18 Mt of concentrate. The concentrate is slurried 18 km to the steel mill at Glenbrook where it is blended with Huntly sub-bituminous coal in the ratio of about 1.8:1 and heated in reduction kilns to form sponge iron containing 70% Fe. The sponge iron is melted in an electric arc furnace to produce molten pig iron. A vanadium-rich slag is separated as a valuable by-product. Currently 12,000 t/yr is produced and exported to China, representing 1% of the world's vanadium production.



Bucketwheel excavator mining titanomagnetite ironsand, Waikato North Head



Mining titanomagnetite sands, Waikato North Head

At Taharoa, ironsand is mined by dredging beach and dune sand to produce concentrate averaging 40% titanomagnetite. Annual production has been about 1.4 Mt since the operation opened in 1972. The concentrate is slurried through a 3 km long pipeline to an offshore loading facility for export. Total exports to the end of 1996 were 31 Mt, mainly to Japan, with small quantities to South Korea and China.

A mine at Waipipi, near Waverley, closed in 1987.

► Ilmenite beach sands

Ilmenite-rich black sands, with locally economic concentrations of gold, are present at intervals along 320 km of the west coast of the South Island. The largest ilmenite deposits are at Barrytown (6.9 Mt of ilmenite) and near Westport (5.5 Mt of ilmenite). The black sands contain 5-15% ilmenite with a titanium dioxide content (45-47% TiO₂) that is low by world standards. The sands also contain significant garnet and magnetite and minor zircon, uranotorite and monazite. Westport ilmenite has been successfully treated to produce high purity synthetic rutile (TiO₂).

The very large resources (500 Mt) of titanomagnetite (averaging 23% of the raw sand) in the west coast North Island ironsands contain 7 - 8% TiO₂. Ilmenite beach sand deposits are also present on the east coast of the Coromandel Peninsula in the North Island.

There has been no production of titanium oxide from New Zealand deposits. Recovery of titanium from the titanium-bearing slag produced by smelting of the Waikato North Head titanomagnetite ironsand is not currently economic.